



## Modeling of regional climate change effects on ground-level ozone and childhood asthma

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**Year:** 2011  
**Journal:** American Journal of Preventive Medicine. 41 (3): 251-257; quiz A253

### Abstract:

**BACKGROUND:** The adverse respiratory effects of ground-level ozone are well established. Ozone is the air pollutant most consistently projected to increase under future climate change. **PURPOSE:** To project future pediatric asthma emergency department visits associated with ground-level ozone changes, comparing 1990s to 2020s. **METHODS:** This study assessed future numbers of asthma emergency department visits for children aged 0-17 years using (1) baseline New York City metropolitan area emergency department rates; (2) a dose-response relationship between ozone levels and pediatric asthma emergency department visits; and (3) projected daily 8-hour maximum ozone concentrations for the 2020s as simulated by a global-to-regional climate change and atmospheric chemistry model. Sensitivity analyses included population projections and ozone precursor changes. This analysis occurred in 2010. **RESULTS:** In this model, climate change could cause an increase in regional summer ozone-related asthma emergency department visits for children aged 0-17 years of 7.3% across the New York City metropolitan region by the 2020s. This effect diminished with inclusion of ozone precursor changes. When population growth is included, the projections of morbidity related to ozone are even larger. **CONCLUSIONS:** The results of this analysis demonstrate that the use of regional climate and atmospheric chemistry models make possible the projection of local climate change health effects for specific age groups and specific disease outcomes, such as emergency department visits for asthma. Efforts should be made to improve on this type of modeling to inform local and wider-scale climate change mitigation and adaptation policy.

**Source:** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3160600>

### Resource Description

#### Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

**Special Report on Emissions Scenarios (SRES) Scenario:** SRES A2

#### Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature

**Air Pollution:** Ozone

# Climate Change and Human Health Literature Portal

**Temperature:** Fluctuations

**Geographic Feature:** ☒

resource focuses on specific type of geography

Urban

**Geographic Location:** ☒

resource focuses on specific location

United States

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Respiratory Effect

**Respiratory Effect:** Asthma, Other Respiratory Effect

**Respiratory Condition (other) :** reactive airway disease

**Mitigation/Adaptation:** ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

**Model/Methodology:** ☒

type of model used or methodology development is a focus of resource

Outcome Change Prediction

**Population of Concern:** A focus of content

**Population of Concern:** ☒

populations at particular risk or vulnerability to climate change impacts

Children

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Medium-Term (10-50 years)

**Vulnerability/Impact Assessment:** ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content

